PN - DE29603229U U 19960523

PD - 1996-05-23

PR - DE19962003229U 19960222

OPD - 1996-02-22

PA - WUNDERLICH GMBH & CO KG GEB (DE)

EC - A63B69/36G ; B32B5/26 ; B60R13/08 ; D04B21/04 ; D06N7/00B6 ; F16F7/00B4 ; A47L23/26C

IC - A47L23/26

TI - Textile foot wiping product - includes collecting layer consisting of dimensionally stable and flexible, three=dimensional textile space structure

PR - DE19962003229U 19960222;DE19962002701U 19960215;DE19961028856 19960717;DE19961039006 19960923

PN - DE29603229U U1 19960523 DW199626 A47L23/26 013pp

- US5908673 A 19990601 DW199929 A01N3/00 000pp

PA - (WUND-N) GEBR WUNDERLICH GMBH & CO KG

IC - A01N3/00 ;A47L23/26

IN - MUHLBERGER P

AB - DE29603229 A textile foot wiping product has a carrier layer (1), a runner layer (3) with a cleaning effect and a collecting layer located between the two other layers. The collecting layer (3) consists of a dimensionally stable and flexible three dimensional textile space structure (4) with a top layer (5) and a bottom layer (6) formed out of monofilament or multifilament yarn. The top layer (5) features openings (7), the bottom layer (6) is fastened in the carrier layer (1). The top and bottom layers (5, 6) are connected to each other by means of pile yarns (8) and at a distance from each other. The carrier layer (1) is made of plasticised plastics, preferably PVC, PE, PA, PP, PES or blends of the above. The textile space structure (4) is preferably made of one of the same plastic materials.

- USE - The invention features an improved dirt absorbing capacity.
- (Dwg. 1/3)

USAB - US5908673 The textile mat material, with shock and water absorbency, is a three dimensional structure (50) with an upper layer (7) of material, and a lower material layer (9), of monofilaments or multifilament yarns, linked together by elastic pile yarns (8). The spaced mat (50) is preferably of polyester, polyamide, polyethylene, polypropylene, polyvinyl chloride, or their mixtures.

- USE - The mat is for applications such as a golf driving mat at a driving range, water and/or shock absorbent mats for vehicles, and the like.
- ADVANTAGE - The mat structure makes it suitable for a wide variety of applications, with a long life to absorb shocks and water.

OPD - 1996-02-15

AN - 1996-252665 [26]

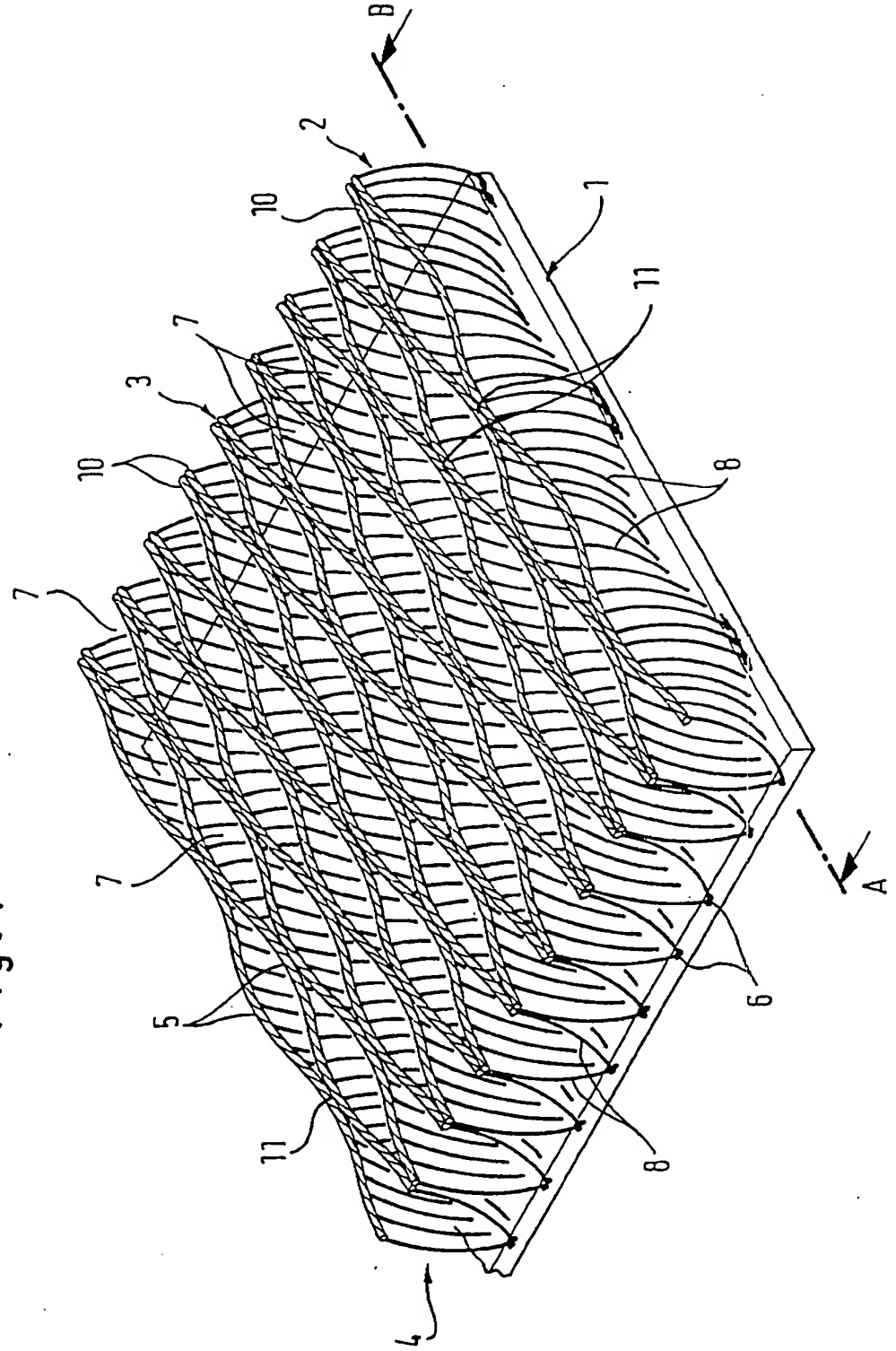


Fig.1

Eisenführ, Speiser & Partner

Munich,	22 February 1996
Our ref.:	W 5080 PSM/ch
Applicant/Holder:	Gebr. Wunderlich GmbH & Co. KG
File number:	New application

Gebr. Wunderlich GmbH & Co. KG

Doormat fabric with collecting layer

The invention concerns a doormat fabric according to the first portion of claim 1.

Doormat fabric is known. The traditional doormat consists of a backing layer resting on the ground, onto which is applied a top layer made from a brush material. The function of the brush material is to remove dirt from the shoe soles on walking across the top layer, i.e. to exercise a cleaning action.

Although in principle such a doormat fabric has a satisfactory cleaning action, when walked across with heavily soiled shoes, however, the limit of its dirt absorption capacity is soon reached and is exhausted. The absorption of dirt takes place in the space that is available in the brush material of the top layer due to the spacing of the bristles. In this area the top layer acts as a collecting layer for dirt, but the size of this layer cannot be increased indefinitely because this would lead to too large a spacing between the bristles and would call into question the mechanical strength of the top layer.

Once the brush material has been exhausted, further dirt thus continues to adhere to the shoe soles and is distributed after the doormat fabric has been walked across - particularly in places with high foot traffic (for example in the foyer of a hotel or in the interior of an office building). In particular, once its maximum dirt absorption capacity has been reached, the doormat fabric displays an "ink pad" effect, i.e. when the fabric is walked across, the dirt continues to adhere to the shoe soles and is transferred to the adjoining floor.

The object of the invention is to overcome these disadvantages of the prior art and to provide a doormat fabric having improved dirt absorption capacity.

This object is achieved in a doormat fabric of the type mentioned at the start through the features of the characterising part of claim 1. Further developments of the doormat fabric according to the invention are described in the subordinate claims.

According to the invention the collecting layer is formed with the aid of a dimensionally stable and flexible, three-dimensional textile spacing structure, which displays an upper fabric layer and a lower fabric layer made from monofilament or multifilament yarn. At least the upper fabric layer of the spacing structure displays openings, the lower fabric layer is anchored in the backing layer, and the two fabric layers are connected to each other and separated from each other by pile threads.

The invention derives from the observation that three-dimensional textile structures can display a surprising dimensional stability when subjected to pressure and can then be used as the dirt-absorbing collecting layer of a doormat fabric. Such textile structures are known from the area of technical textiles and are used for many purposes, for example for rear ventilation to prevent water condensation (underneath mattresses and inside yachts for example), for drainage, for the interior padding of crash helmets, for the reinforcement of composite materials and as splash guards for lorries.

The dimensional stability of such textile structures can easily be estimated by pressing then with the palm of the hand. They behave similarly to corrugated cardboard, i.e. they collapse when the load exceeds a particular level but up to that point they are relatively stable, and unlike corrugated cardboard they straighten up again after collapsing. The dimensional stability is increased by the anchoring according to the invention of the lower fabric layer in the backing layer of the doormat fabric. A walkable and hard-wearing material is thus produced with a substantially improved dirt absorption capacity, because the entire internal volume of the spacing structure is available for dirt absorption. The openings provided in the upper fabric layer act here like the holes in a grid, i.e. when the doormat fabric is walked across they remove the dirt from the shoe soles and let it drop into the collecting layer. When the collecting layer is full of dirt it can easily be rinsed out with water (optionally using a water jet).

A spacing structure whose internal volume (i.e. the volume between the upper and the lower fabric layer) forms an area that extends continuously through the spacing structure is particularly preferred. This embodiment has the advantage that the water does not accumulate when the doormat fabric is rinsed out and the dirt flows away more easily. For example, a doormat fabric designed in this way can be laid in a floor area that is subject to heavy foot traffic in such a way that it can be removed and cleaned separately, without the other areas of the floor being affected.

A preferred spacing structure is a looped, woven or knitted fabric in which the pile threads consist of dimensionally elastic monofilament wire. The stiffness of monofilament pile threads, which are incorporated into both the upper and the lower fabric layer, produces a further increase in dimensional stability in this embodiment. A ribbed textile plastic looped fabric whose upper fabric layer is made from a multifilament yarn and whose lower fabric layer is made from monofilament wire is particularly preferred. The thickness of the monofilament wire is preferably in a range from 0.1 to 1 mm.

From the point of view of dimensional stability and load-bearing capacity when walked across, a textile spacing structure in which the multifilament yarn in the upper fabric layer is worked by looping to form wales has proved to be particularly preferable. These wales form the upper fabric layer and run side by side in the form of wavy lines. Every second wavy line here is offset alternately by half a wave to the adjacent wavy line in the manner of a phase shift. In the longitudinal direction of the wales or

wavy lines, alternating regions are thus formed in which the wavy lines approach each other and form contact points and regions in which they move apart from each other and form openings. In the region in which the lines approach, a wave maximum in one wale lies opposite to a wave minimum in the adjacent wale and touches it, whilst in the region in which the lines move apart, the subsequent wave minimum in the longitudinal direction in this wale lies opposite to the subsequent wave maximum in the longitudinal direction in the adjacent wale and forms an opening.

The progression of wavy-lined wales forming contact points and openings is stabilised by the monofilament wire. This is passed continuously to and fro between the upper fabric layer and the lower fabric layer, i.e. it comes from the lower fabric layer, passes through the wales, turns around and runs back to the lower fabric layer, and so on. It is not passed perpendicularly to the fabric layers but assumes an angle to the vertical that gradually increases and decreases according to the shape of the wavy lines so that the wavy lines are formed. Openings can be created in this way that have a rhomboidal to spherical shape. Overall a top layer is produced with a rigid structure that displays an adequate dimensional stability.

Such a progression of the pile thread can be achieved for example with a spacing structure in which the lower fabric layer too is formed from wales running in wavy lines. The structure of the two fabric layers is thus identical, but the lower fabric layer is offset relative to the upper fabric layer such that a contact point in the upper fabric layer is positioned above an opening in the lower fabric layer.

In a further development of the embodiment described above, the multifilament yarn worked into wales in the upper fabric layer is a fine fibrous yarn (e.g. dtex 167/2). The fibrous yarn produces an even better dimensional stability and load-bearing capacity and also gives the upper fabric layer a particularly pleasing appearance (look).

This further development can be designed in such a way that the fibrous yarn worked into wales is flocked with oblong particles. The flock coating can be applied by coating the fibrous yarn with an adhesive, precipitating the particles onto the fibrous yarn in an electrostatic field and then drying the adhesive. In this type of precipitation (wherein particles of electrostatically chargeable plastic are preferably used), the particles substantially lie perpendicularly to the wales, leading to an extremely pleasing appearance which resembles the pile of a carpet. This appearance can be varied as desired by using coloured particles and/or by printing them.

If a looped, woven or knitted spacing structure is used, the doormat according to the invention can be produced on conventional production lines which are known to the person skilled in the art in the area of the production of technical textiles. Here the spacing structure is produced continuously by looping, weaving or knitting and supplied to a production line (either after intermediate storage in the form of rolled up webs or directly). In the production line one side of the spacing structure is continuously coated with a plasticisable polymer compound, the coating being applied to the side

that will later form the lower fabric layer. During coating the lower fabric layer penetrates into the polymer compound and creates the conditions for a subsequent anchoring therein. The polymer compound then undergoes thermal plasticisation. At the end of the production line the grey cloth produced in this way is either rolled up in the form of wide webs for intermediate storage or immediately undergoes further processing.

If the intended use is one in which the doormat fabric is freed from accumulated dirt by rinsing with water as mentioned above (this will mainly be the case), the textile spacing structure and the backing layer should substantially not be absorbent, so that lengthy drying is not necessary after rinsing with water. The backing layer should moreover preferably be waterproof, so that when the doormat fabric is walked across with wet shoe soles, water does not penetrate into its base layer. The spacing structure and backing layer are therefore preferably made from plastic.

Polyester or polyamide are particularly preferred for the textile spacing structure because of the dimensional stability that can be achieved with them. In addition, polyethylene, polypropylene, polyvinyl chloride or mixtures thereof can in principle also be used. A plasticisable plastics material such as polyvinyl chloride, polyethylene, polyamide, polypropylene, polyester or mixtures thereof, for example, is suitable for the backing layer, polyvinyl chloride being preferred. If for the reasons given the backing layer is to be waterproof and non-absorbent, the plasticised plastics material must be unfoamed or closed-cell foamed.

For conventional purposes the collecting layer has a thickness of 4 to 20 mm, and the spacing structure and production parameters are chosen in such a way that this value is established.

Other advantages, features and possible applications of the invention derive from the following description of a preferred embodiment in conjunction with the drawing:

Figure 1 shows a perspective view of a doormat fabric according to the invention;

Figure 2 shows a cross-section through the doormat fabric from Figure 1 along the axis A-B to illustrate the structure of a preferred looped spacing fabric;

Figure 3 shows a perspective view of the doormat fabric from Figure 1 with a flock coating.

Figure 1 shows a perspective view of a doormat fabric according to the invention. The fabric is composed of a backing layer 1, a top layer 3 and a collecting layer 2 positioned between these two layers, the collecting layer 2 being formed from a looped spacing fabric 4.

The looped spacing fabric 4 displays an upper fabric layer 5 and a lower fabric layer 6. Here the upper fabric layer 5 is formed by skein-shaped wales 10, which are connected to and separated from the lower fabric layer 6 by pile threads 8 in the form of monofilament wire. The wales 10 run side by side in the form of wavy lines. The lower fabric layer 6 is formed from a monofilament wire.

As has already been explained in detail, the wavy lines of the wales 10 are offset in respect of one another in such a way that in the longitudinal direction of the wales 10 alternating regions are formed in which the wavy lines approach each other and form contact points 11 and regions in which they move apart from each other and form openings 7. As can be seen from Figure 1, the required progression of wales 10 is achieved by guiding the monofilament wire 8 accordingly in the area of the collecting layer 2.

In the embodiment example shown, the looped spacing fabric 4 consists of polyester and the backing layer 1 of unfoamed plasticised PVC. As can be seen, the lower fabric layer 6 is completely embedded in the plasticised plastic of the backing layer 1 and is thus anchored within it.

As can be seen from Figure 1, the wales 10 running in wavy lines give a very agreeable and harmoniously aesthetic appearance, i.e. an overall visual impression which is ideally suitable for floor covering fabric.

Figure 2 shows a cross-section through the doormat fabric from Figure 1 along the axis A-B to illustrate the structure of the looped spacing fabric 4. The illustrated embodiment of the looped spacing fabric 4 displays an upper fabric layer 5 and a lower fabric layer 6. Pile threads 8 made from dimensionally elastic monofilament wire, which run to and fro between the two fabric layers 5, 6, serve to separate the two fabric layers from each other and at the same time to connect them together. The lower fabric layer 6 consists of monofilament wire whose thickness is of the same order of magnitude as that of the monofilament wire in

the pile threads 8 (for clarification the pile threads 8 and the lower fabric layer 6 are drawn with the same line width). The thickness of the pile threads 8 is 0.3 mm, but that of the monofilament wire in the lower fabric layer 6 is 0.18 mm. The upper fabric layer 5 is made from a multifilament yarn of dtex 167/2 and for clarification is drawn with a thinner line width. In addition, in the present example a further monofilament wire, likewise with a thickness of 0.18 mm, is incorporated into both the lower fabric layer 6 and the upper fabric layer 5. All materials are polyester. The separation of the two fabric layers 5, 6 with monofilament wire creates a continuous space which for the reasons already given represents a preferred embodiment of the collecting layer 2.

To simplify the drawing the detailed structure of the upper fabric layer 5 and the lower fabric layer 6 is not shown. Not shown in particular is the fact that the upper fabric layer 5 is made from a fibrous yarn which is worked into skein-shaped wales 10. The precise progression of the monofilament wires 8 is as already described. They do not run exactly in the plane of the drawing but are inclined to this plane. This inclination differs from pile to pile so that overall the wavy-lined progression of wales 10 is formed.

Figure 3 shows an embodiment of the doormat fabric according to the invention wherein the wales 10 running in wavy lines have a flock coating 12. As already mentioned, from an aesthetic perspective the flock coating 12 enhances the favourable optical overall impression of the floor covering fabric, from a functional perspective it acts as a fine brush and improves the cleaning action.

Key

1	Backing layer
2	Collecting layer
3	Top layer
4	Looped spacing fabric
5	Upper fabric layer
6	Lower fabric layer
7	Openings
8	Pile threads
9	
10	Wales
11	Contact points
12	Flock coating

Claims

1. Textile doormat fabric displaying a backing layer (1), a top layer (3) having a cleaning action and a collecting layer (2) positioned between the backing layer (1) and the top layer (3)
characterised in that
the collecting layer (3) is formed from a dimensionally stable and flexible, three-dimensional textile spacing structure (4), which displays an upper fabric layer (5) and a lower fabric layer (6) made from monofilament or multifilament yarn, the upper fabric layer (5) displaying openings (7), the lower fabric layer (6) being anchored in the backing layer (1) and the two fabric layers (5, 6) being connected to each other and separated from each other by pile threads (8).

2. Doormat fabric according to claim 1, characterised in that the volume between the upper and the lower fabric layer (5, 6) forms a space extending continuously through the spacing structure (4).

3. Doormat fabric according to claim 1 or 2, characterised in that the textile spacing structure is a looped spacing fabric (4), woven spacing fabric or knitted spacing fabric, the pile threads (8) consisting of dimensionally elastic monofilament wire.

4. Doormat fabric according to claim 3, characterised in that the textile looped spacing fabric (4) is a ribbed textile looped plastic fabric whose upper fabric layer

(5) is made from multifilament yarn and whose lower fabric layer (6) is made from monofilament wire.

5. Doormat fabric according to claim 3 or 4, characterised in that the monofilament wire has a thickness of 0.1 to 1 mm.

6. Doormat fabric according to one of the preceding claims, characterised in that the collecting layer (3) displays a thickness of 4 to 20 mm.

7. Doormat fabric according to one of the preceding claims, characterised in that the textile looped spacing fabric (4) is made from a plastic, preferably from polyester, polyamide, polyethylene, polypropylene, polyvinyl chloride or mixtures thereof.

8. Doormat fabric according to one of claims 4 to 7, characterised in that the multifilament yarn in the upper fabric layer (5) is worked by looping to form skein-shaped wales (10) which form the upper fabric layer (5) and run side by side in wavy lines, the wavy lines being offset alternately in respect of one another so that in the longitudinal direction of the wales (10) alternating contact points (11) and openings (7) are formed.

9. Doormat fabric according to claim 8, characterised in that the multifilament yarn in the upper fabric layer (5) worked into wales (10) is a fibrous yarn.

10. Doormat fabric according to claim 9, characterised in that the fibrous yarn worked into wales (10) has a

flock coating (12) with oblong particles, which substantially lies perpendicularly to the wales, the flock coating (12) preferably consisting of coloured plastics particles and optionally being printed.

11. Doormat fabric according to one of the preceding claims, characterised in that the backing layer (1) is made from a plasticised plastics material, preferably from polyvinyl chloride, polyethylene, polyamide, polypropylene, polyester or mixtures thereof.

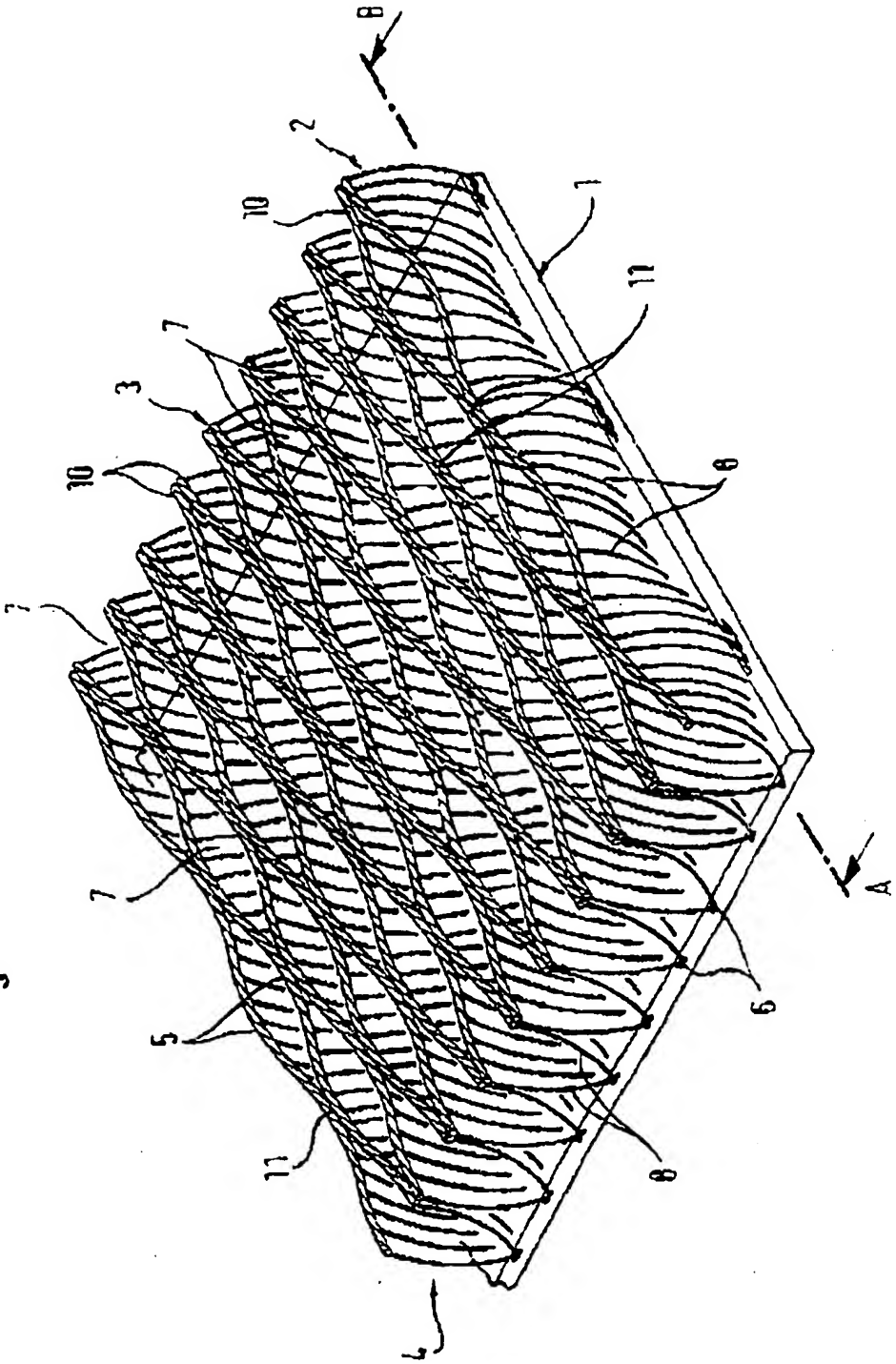


Fig. 1

Fig. 2

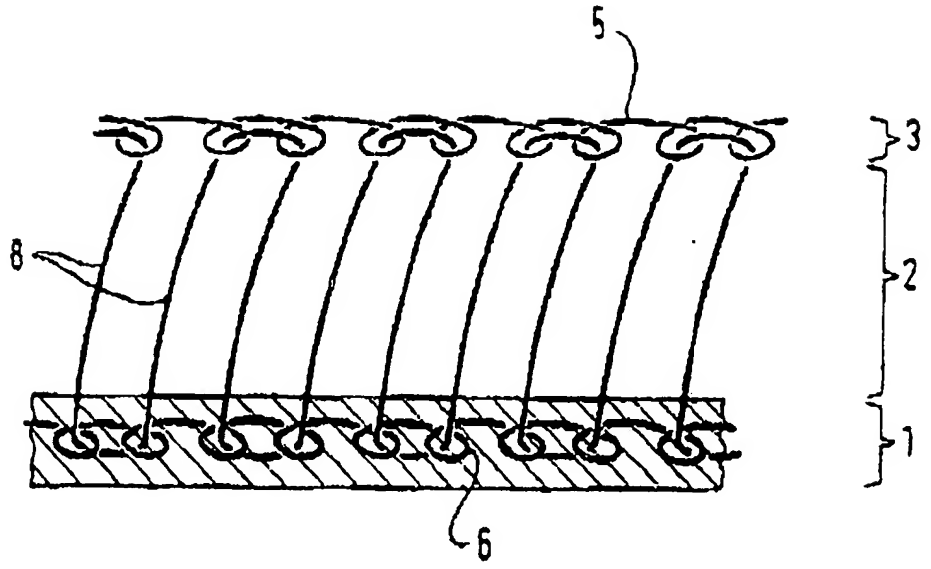
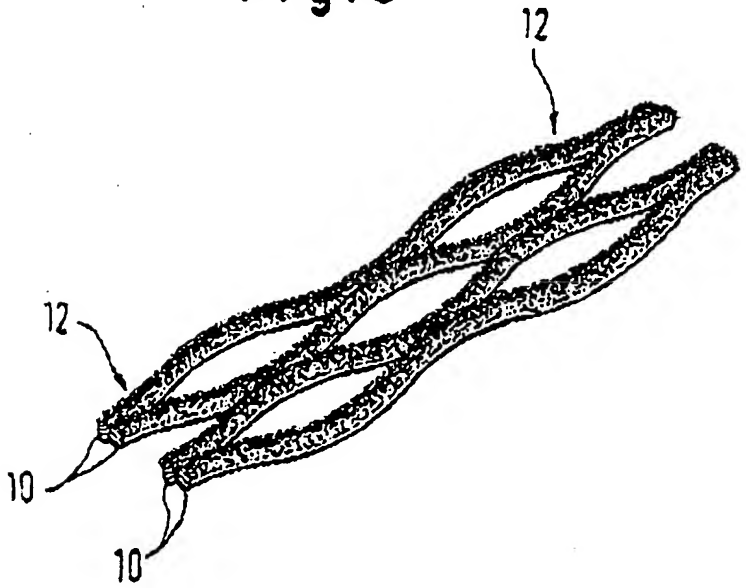


Fig. 3



Translator's notes

German page 7 line 13

"Monofiltrat" does not appear to exist and is almost certainly a typo for "Monofildraht"

German page 10 line 11, line 37

"Sammelschicht (3)" should read "Sammelschicht (2)"